Strongyloides Infection in Hawaii: An Imported Case

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Tropical diseases may present anywhere in the world. A case of strongyloidiasis in Hawaii, identified by a characteristic manifestation, larva currens, *is described.* Strongyloides *infection may persist long after leaving an endemic area through the mechanism of autoinfection and, especially under circumstances of immunosuppression, may become overwhelming (the hyperinfection syndrome), with a likelihood of being fatal. Each case of* Strongyloides *infection should be treated aggressively in order to prevent this dangerous outcome; in addition, the parasite should be eliminated before immunosuppressive therapy is begun.*

Introduction

Strongyloides stercoralis, the threadworm, is a nematode widely distributed in the tropics and subtropics, particularly in Southeast Asia, tropical South America and sub-Saharan Africa[1,2]. It also is present in the southeastern United States[2,3]. This human parasite has a rather complicated life cycle that sometimes results in autoinfection. In such instances, the adult female worm lays eggs that hatch into *rhabditiform larvae*, which in turn develop into invasive *filariform larvae* (a) either within the intestinal lumen or (b) through the perianal skin[4,5]. In either case, invasion by these larvae through the mucosa or the skin maintains or amplifies the infection in the absence of reexposure to *Strongyloides* from the external environment. In this way, people with the disease may present themselves for treatment far from endemic areas of infection.

Here we have a case to report from the Waianae Coast Comprehensive Health Center.

Case Report

A 45-year-old Vietnamese man presented himself with a complaint of pruritic rash which had reoccurred almost monthly for the past 6 years. He had been treated for this several times previously with various medications, the names of which he did not recall, but with no relief. He reported occasional cough and shortness of breath but no wheezing, abdominal pain or diarrhea. He had lived in Vietnam until 1985, and subsequently had lived in Hong Kong for one year (when the rash first appeared), the Philippines for 6 months, and Kansas for 2 years before coming to Hawaii 2 years ago.

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Examination of the skin revealed 3 separate areas (left lower chest, right abdomen, right buttock) of eruption characterized by one or more serpiginous, linear, non-indurated wheals surrounded by an erythematous flare (see Figure). The remainder of the examination was not noncontributory.

Microscopic examination of a stool specimen demonstrated *rhabditiform larvae* of *Strongyloides stercoralis* and hookworm ova.

The patient was given thiabendazole 20 mg/kg p.o. b.i.d. for 2 days and diphenhydramine 25 mg to 50 mg p.o. q.6 h. p.r.n. for the infection and for symptomatic relief of the pruritis respectively. Subsequently he was prescribed mebendazole 100 mg p.o. b.i.d. for 3 days to eliminate the infestation with hookworm.

During the following 4 months he had no recurrence of the rash; this represents the longest asymptomatic period since his affliction began. However, he failed repeatedly to provide a sample for follow-up stool examinations.

Eight family members also lived in Vietnam and were asked to provide stool samples for examination. Only one of them provided a single specimen, which was negative for *Strongyloides*.

Discussion

Uncomplicated Strongyloides infection is characterized most frequently by diarrhea and abdominal pain; or it can be totally asymptomatic[6,7,8].

In the case we present here, we presume that the patient acquired his infection in Vietnam and that it persisted through the mechanism of autoinfection.

Strongyloides is known to be widespread in Southeast Asia[1,2]. A high proportion of British troops who served there during World War II and were imprisoned by the Japanese became infected[9,10,11], as did some American troops who served in the Vietnam war[12,13]. Southeast Asian refugees who emigrated to the United States and other countries have shown various rates of infection[2,14].

Autoinfection may result in repeated episodes of linear urticarial cutaneous eruptions from migrating larvae, as seen in the present case. This manifestation has been termed *larva currens* (Latin: racing larva) to describe the celerity with which the larvae and consequent rash move and spread, as much as 10 cm per hour[15]. This is in contrast to the more deliberate pace of cutaneous *larva migrans*, which is usually caused by nonhuman hookworm larvae, and consists of an indurated linear track with little or no flare[1]. *Larva currens* has been described as occuring frequently among the Allied troops who had been prisoners of war in Southeast Asia during World War II[9,10,11,16,17]. The rash is considered by some to be pathognomonic of strongyloidiasis[5,9,15]. *Larva currens* is reported infrequently in other areas where *Strongyloides* infestation is endemic; it may be specific to the strain of parasite

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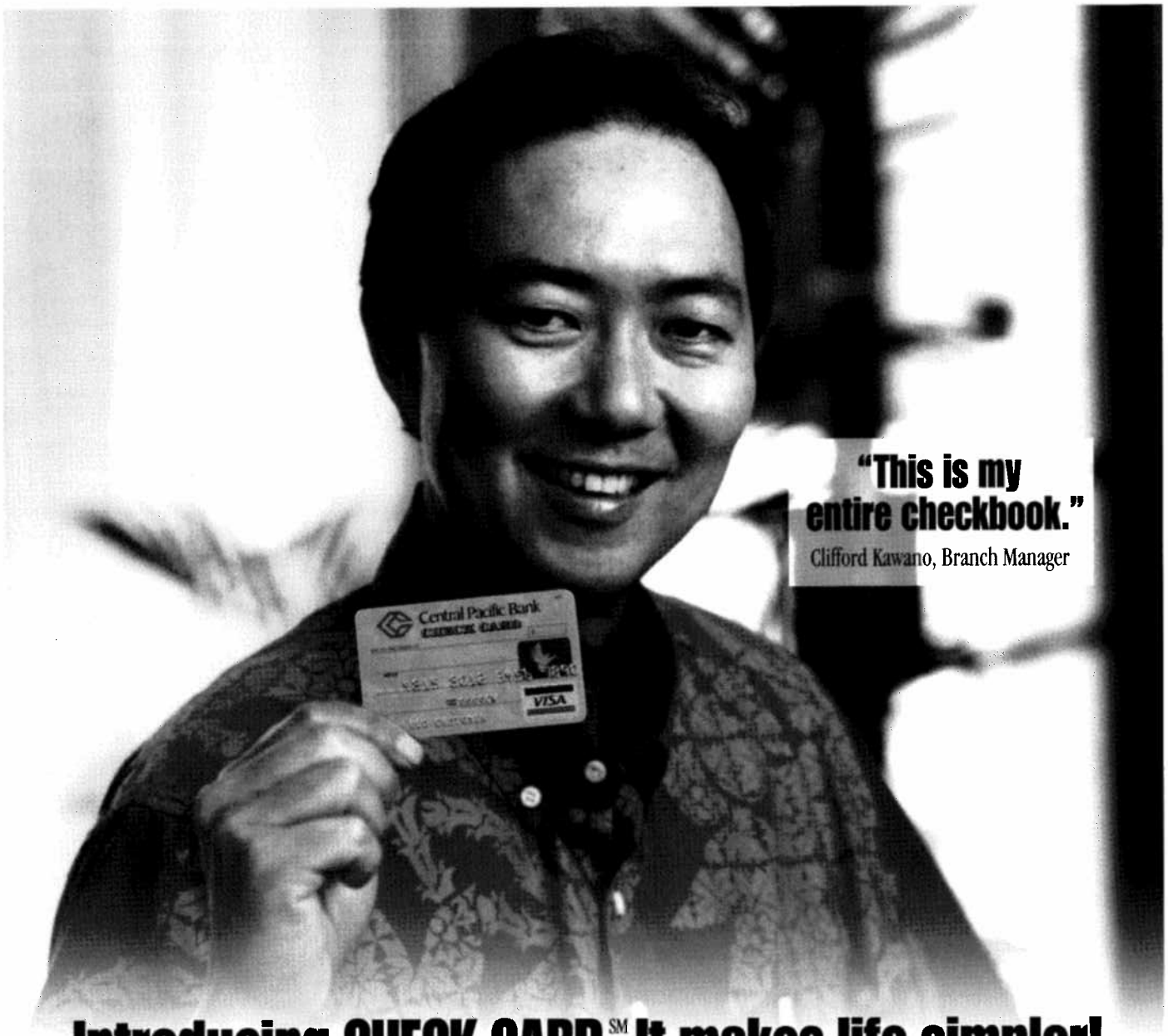

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prevalent in Southeast Asia[17].

Another consequence of autoinfection is that successive generations of parasites may sustain an infection for an extraordinary span of time. The author saw a patient in London, a former prisoner of war, who had *larva currens* for a period of about 45 years since his repatriation from Southeast Asia. Leighton and MacSween have reported a woman who suffered symptoms of strongyloidiasis for approximately 65 years[18].

A third possible sequelum of autoinfection is disseminated strongyloidiasis, a so-called hyperinfection[7,19,20], which may occur in both immunocompetent and immunocompromised hosts. *Filariform larvae* may invade virtually every tissue, sometimes in overwhelming numbers, leading to complications such as bowel necrosis and perforation, pulmonary consolidation, respiratory distress, and bacterial infections (sepsis and meningitis); the latter condition presumably the result of intestinal bacteria accompanying the migrating larvae[5,6,20].

The case fatality rate for reported hyperinfection syndrome (HS) is very high, about 77% in immunocompromised hosts according to one review of the English language literature[20]. Conditions associated with HS include malnutrition[7], malignancy, particularly of the lymphatic system[20,21], and with treatment of corticosteroids or other immunosuppressive drugs[20,22]. HS has been in patients with the acquired immunodeficiency syndrome[23,24], although not to a marked degree[25]. Of note, the urticaria and pruritis of *larva currens* may prompt treatment with corticosteroids[8,18], a potentially fatal error.

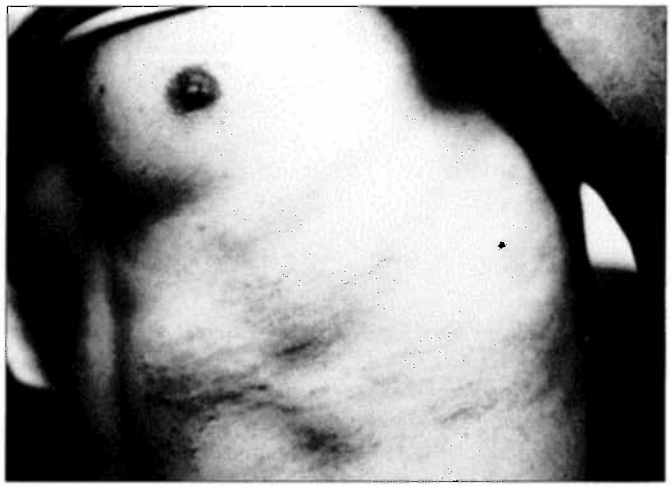
The diagnosis of parasitic infections is best accomplished by finding the parasite. Stool examination, as in this case, may reveal *Strongyloides larvae*[26]. However, larval passage in stools is variable[6] and multiple examinations may be required[9]. Examination of duodenal contents either by aspiration[27] or by sampling with a retrievable swallowed nylon string (Entero-Test, HDC Corp., Mountain View, California) has been advocated[28], as has sputum examination for larvae[5]. Pelletier and colleagues have evaluated an ELISA for antibody to *Strongyloides* larval antigen and found it useful[17].

Treatment of uncomplicated strongyloidiasis involves thiabendazole[29,30], albendazole, or ivermectin[30,31].

In view of the possibility of subsequent HS, every patient in whom *Strongyloides* infection is diagnosed should be treated. Furthermore, every patient in whom immunosuppressive therapy is contemplated, and who may have been exposed to *Strongyloides* eg residence in an endemic area), should be evaluated for the parasite and treated if infected[2,5,6,9,20,21,22].

Conclusions

Whether the world is growing smaller (improved communications and transportation, increased travel and migration) or becoming more tropical (global warming), tropical diseases are now a matter of potential concern in every part of the world[32]. It is being recognized more and more that physicians need to become familiar with this branch of medicine[33,34,35,36]. For example, the United States, including Hawaii, has recently experienced cases of cholera[37,38], malaria[39,40] and dengue[41] reported from several states. Hawaii is the most nearly tropical of the states and it is a crossroad of Pacific travel. The medical community can expect to encounter a variety of imported, as well as indigenous exotic disorders, and should remain alert to them.



Larvae currens: eruption on left lower chest, with several serpiginous linear wheals and surrounding erythematous flare.

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(Continued on page 76) ➤

STRONGYLOIDES INFECTION IN HAWAII

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